Texas Probable Maximum Precipitation (PMP)

Web Map - User Guide

The PMP GIS tool is a geoprocessing service hosted by the TCEQ.

This web map has been created for those who do not have ArcGIS.

Please note that watersheds derived from ESRI's Watershed Analysis tool may or may not be accurate, and therefore should not be utilized in replacement of ArcGIS.

This tool calculates gridded PMP depths for a given drainage basin for the specified durations for general, local, and tropical storm types. PMP values are calculated (in inches) for each grid point (spaced at 90 arc-second intervals) within (or adjacent to) the drainage basin. A Basin Average table is created over the basin using the grid point PMP values.

The PMP Geoprocessing tool within this Web Map will have a max processing load of 6 instances at a single time. This is to ensure efficient processing time and capacity.

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Obtaining Access to Use the Web Map

First thing that MUST happen is an ArcGIS Developers Account setup.

It is essential to sign-up for the free **developers** account. The developers account will provide access to utilize the ESRI Analysis tools and can store the outputs created within the web map.
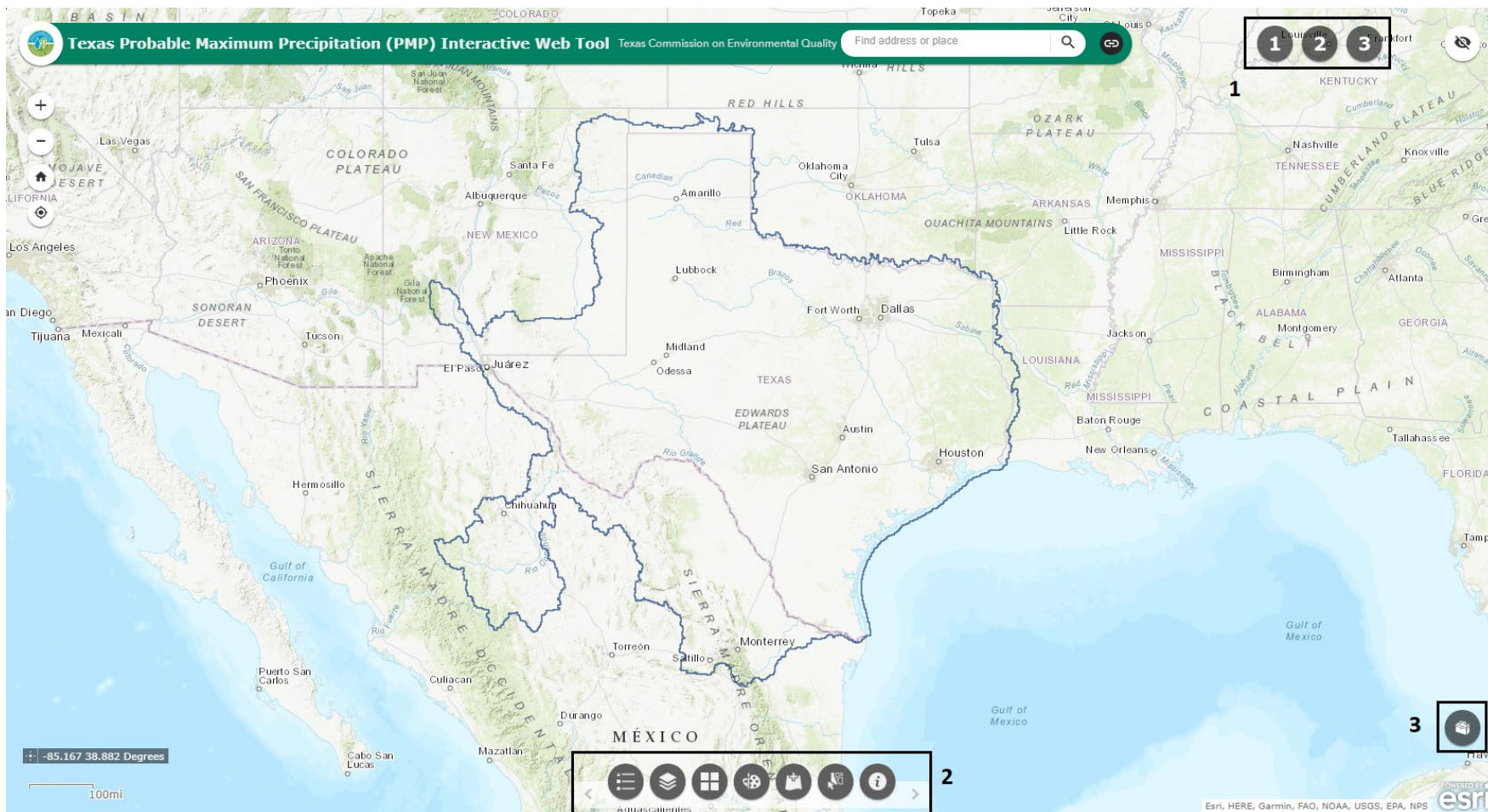
https://developers.arcgis.com/sign-up

KEEP THIS INFORMATION!!

Once the Developers Account is setup, the PMP Web Map can accessed at:

https://gisweb.tceq.texas.gov/PMP/

Texas PMP Interactive Web Map Legend

1
- Step 1. Trace Downstream
- Step 2. Create Watershed
- Step 3. PMP Tool

2
- Legend
- Layer List
- Basemap
- Draw
- Add Data
- Select
- Instruction Update

3
- PMP Tool - Shapefile Upload

Web Map Instructions

Use the following steps to utilize the map:

- Zoom in to the location of the drainage point, or dam. The Search capabilities can also be used to locate a known dam or lake.

- Click the Step 1 icon to access the **Trace Downstream** tool.

- When it opens, accept the defaults and select the draw point button . Place a pin upstream of the dam or drainage point. This process assists in identifying where the watershed point should be placed.

- Press Run.

A login prompt will appear. Use the login credentials from the ArcGIS Developer Account that was setup in the prior step.

Once the Trace Downstream tool is complete, the stream will be displayed on the map.

The next step will utilize the stream to locate where to place the pin for the Create Watersheds tool.

- Navigate back to the Dam.

- Click the Step 2 icon to access the **Create Watershed** tool.

- Use the **Create Watershed** tool to create the Drainage Basin needed for the PMP tool. When it opens, accept the defaults and select the draw point button . Place a pin upstream of the crest of the dam along the flowline created in the previous step. If placed on the crest or downstream slope of the dam, the watershed will not be created correctly.

If needed, click the Basemap Gallery Icon to change the background map to Imagery.
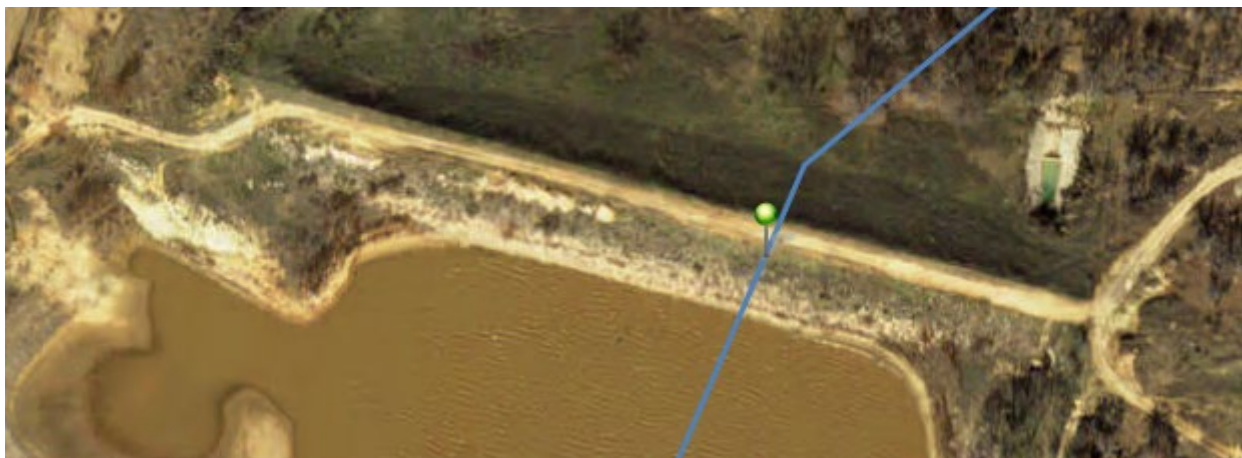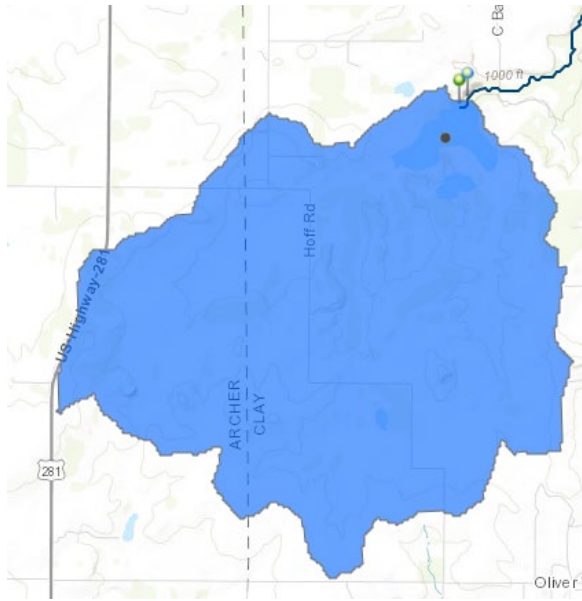
- The watershed will be created and displayed once the tool is finished processing.

Please note that watersheds derived from ESRI's Watershed Analysis tool may or may not be accurate, it is highly advised to visually inspect the drainage basin to ensure output is accurate. Change basemap images to access contour maps.

The option to save the results from the Downstream Trace or the Watershed Tools to the logged in account are outlined below.

- Click ⋯ on the Output window and select Save to My Content.

- Create a unique Title for the layer to identify it in the future.
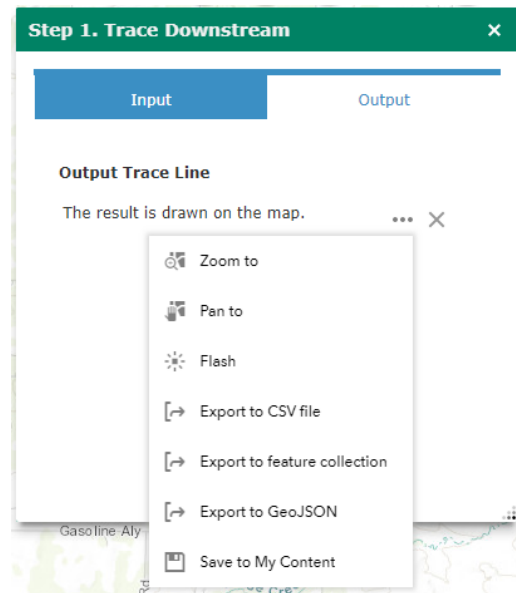
When retrieving a saved layer in a new map session, run the Step 1. Trace Downstream tool in any location to login to the account, then click the Add Data icon .

The Add Data window will open to the Search Tab. Select My Content under the drop-down to access saved layers. Press Add to add the layer to the map.
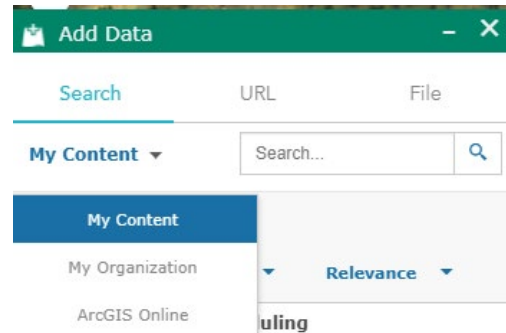
TCEQ Gridded PMP Tool[1]

Input basin

- The Step 3. PMP Tool icon allows the use of the watershed created from Step 2. To utilize this, **click on the watershed to select it and access the pop-up**.
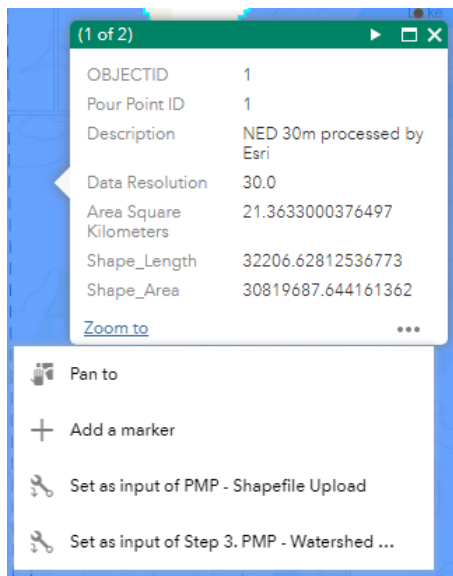
- Click ⋯ on the bottom right of the popup and select **Set as input of Step 3. PMP – Watershed** …

- This will set the input of the tool to the watershed.

Input basin outline shapefile or feature class*

Use the resultant feature(s).   ✕

If the layer contains multiple basins, click the basin needed to highlight a **single** basin. The selected basin will have a lighter blue line surrounding it. **The tool will only provide one output at a time. If multiple basins are processed, the tool will combine the basins into a single output.**

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[1] There are several different methods of input for the PMP Tool. See Map Legend for reference. When utilizing the ESRI Analysis Tools, use the Option 1: Step 3. PMP Tool. This option would also be used with the Add Data/Draw Tools for processing a basin saved to the ArcGIS Developer Account, or drawing a freehand polygon basin.

If a shapefile is available, the Option 3: PMP Tool – Shapefile Upload icon at the bottom right on the map, allows the upload of a shapefile (zipped) by clicking the Add Shapefile button.

Input basin outline shapefile or feature class (zip file)*

Add Shapefile

Use Basin Area / PMP Area

Use Basin Area is the default and should always be checked, unless processing sub-basins.

Please note, the Watershed Analysis tool does not create sub-basins. This must be an external dataset or created by hand.

Use Basin Area*

☑

PMP Area (sqmi)

When processing sub-basins, the **Use Basin Area** is unchecked and a value must be entered in the **PMP Area** field. These steps are outlined in the original PMP Tool Guidelines.

Apply Weighted Average

Apply weighted average to border grid cells

☑

The **Apply weighted average to border grid cells** takes the percent of the Basin covering each cell and adjusts the value.

For instance, in the example to the right, instead of taking the full value of all three cells shown, this option only applies the percent of the covered areas. So, the cell that only has a fraction covered will not be over-valued.

Input	Output

```
Submitted.
Executing...
Executing (TCEQ Gridded PMP Tool): TCEQPMPTool "Feature
Set" 01;02;03;04;05;06;12;24;48;72;96;120
01;02;03;04;05;06;12;24;48;72;96;120
01;02;03;04;05;06;12;24;48;72;96;120 true # true
g:\arcgisserver\directories\arcgisjobs\dst_pmp\tceqpmptoolv
g:\arcgisserver\directories\arcgisjobs\dst_pmp\tceqpmptoolv
g:\arcgisserver\directories\arcgisjobs\dst_pmp\tceqpmptoolv
g:\arcgisserver\directories\arcgisjobs\dst_pmp\tceqpmptoolv
Start Time: Thu Sep 07 14:04:08 2017
Executing (PMP_Test_Reproject_V1.1_with_comments):
TCEQPMPTool "Feature Set"
G:\arcgisserver\directories\arcgissystem\arcgisinput\DST\PMF
01;02;03;04;05;06;12;24;48;72;96;120
01;02;03;04;05;06;12;24;48;72;96;120
01;02;03;04;05;06;12;24;48;72;96;120 true # true
g:\arcgisserver\directories\arcgisjobs\dst_pmp\tceqpmptoolv
g:\arcgisserver\directories\arcgisjobs\dst_pmp\tceqpmptoolv
g:\arcgisserver\directories\arcgisjobs\dst_pmp\tceqpmptoolv
g:\arcgisserver\directories\arcgisjobs\dst_pmp\tceqpmptoolv
Start Time: Thu Sep 07 14:04:08 2017
Running script TCEQPMPTool...
DAD Tables geodatabase path:
G:\arcgisserver\directories\arcgissystem\arcgisinput\DST\PMF
Storm Adjustment Factor geodatabase path:
G:\arcgisserver\directories\arcgissystem\arcgisinput\DST\PMF
Running PMP analysis for storm type: Local
Basin shape type: Polygon
Creating feature class: 'PMP_Points' in Scratch.gdb...
(11 grid points will be analyzed)
...adding field: PMP_01
...adding field: PMP_02
...adding field: PMP_03
...adding field: PMP_04
...adding field: PMP_05
...adding field: PMP_06
...adding field: PMP_12
...adding field: PMP_24
...adding field: PMP_48
...adding field: PMP_72
...adding field: PMP_96
...adding field: PMP_120
...adding field: STORM_01
...adding field: STORM_02
...adding field: STORM_03
...adding field: STORM_04
...adding field: STORM_05
...adding field: STORM_06
...adding field: STORM_12
...adding field: STORM_24
...adding field: STORM_48
...adding field: STORM_72
...adding field: STORM_96
...adding field: STORM_120
AOI basin spatial reference:
WGS_1984_Web_Mercator_Auxiliary_Sphere Unit type:
Meter Spatial reference type: Projected
***The basin shapefile's spatial reference will be
```
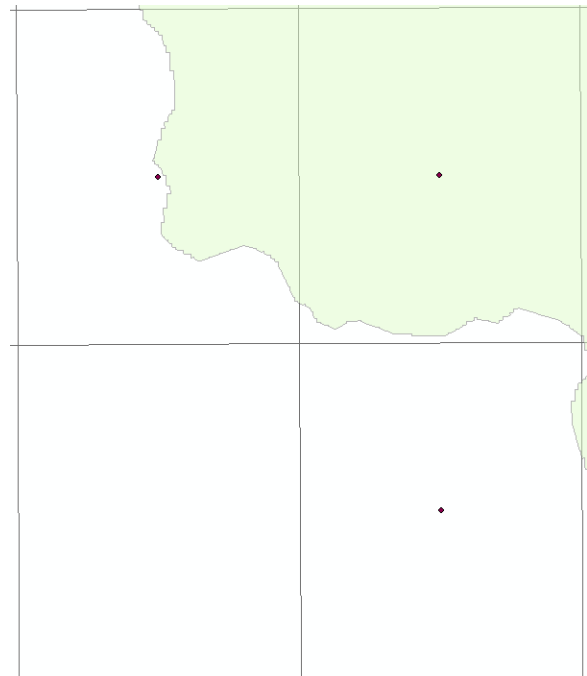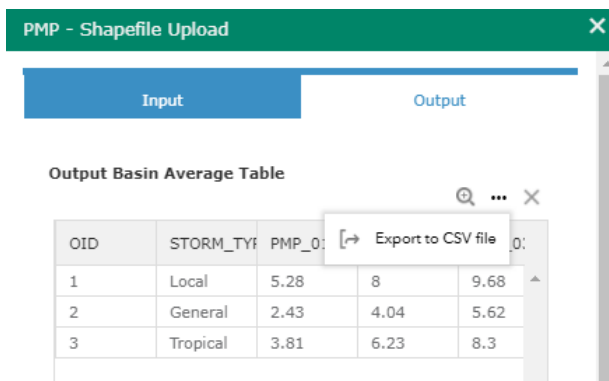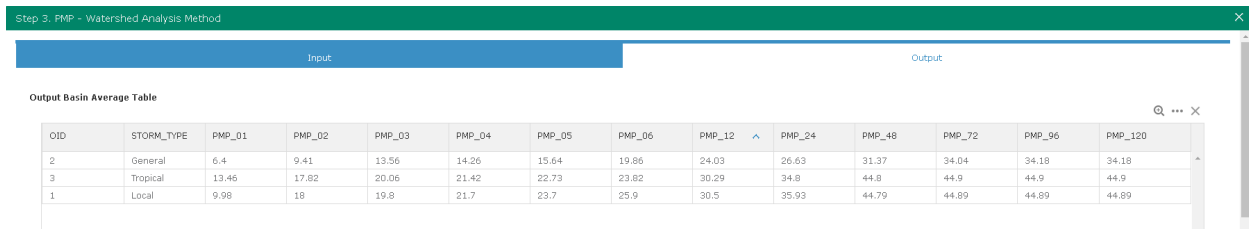
Once all the options are selected, and the tool is running, the Output tab will show the processing status. Depending on the size of the Basin, the processing time could range from 15-40 minutes. During this time, the browser can be minimized. **Do not close the browser.**

Input	Output

Output Basin Average Table

🔍 ⋯ ✕

⤷ Export to CSV file

OID	STORM_TYF	PMP_0:		0:
1	Local	5.28	8	9.68
2	General	2.43	4.04	5.62
3	Tropical	3.81	6.23	8.3

Once the tool has finished processing, the Output tab will show the results as a table. This table cannot be saved to the ArcGIS Developer account. It must be saved manually as a csv output by clicking the ⋯ button, and selecting **Export to CSV** file. Click the magnifying glass to expand the table.

Output

The Basin Average Table is the only output for the web based PMP tool. It contains the PMP values for each storm type and duration. Choose the duration value that makes the most sense for the study. Usually this would be the most conservative value.

	Step 3. PMP - Watershed Analysis Method												X
Input							**Output**						

Output Basin Average Table   🔍 ··· ✕

OID	STORM_TYPE	PMP_01	PMP_02	PMP_03	PMP_04	PMP_05	PMP_06	PMP_12 ∧	PMP_24	PMP_48	PMP_72	PMP_96	PMP_120
2	General	6.4	9.41	13.56	14.26	15.64	19.86	24.03	26.63	31.37	34.04	34.18	34.18
3	Tropical	13.46	17.82	20.06	21.42	22.73	23.82	30.29	34.8	44.8	44.9	44.9	44.9
1	Local	9.98	18	19.8	21.7	23.7	25.9	30.5	35.93	44.79	44.89	44.89	44.89

There is no need to use HMR52 to obtain values. This tool provides the only values needed. Please see the PMP Study Documentation for further reference.

***If the input basin crosses into New Mexico, check the output shapefiles to verify full basin coverage. The PMP study area does not fully extend into New Mexico and will only provide values within the study area. ***

For any questions or troubleshooting, please contact: DamsInfo@tceq.texas.gov